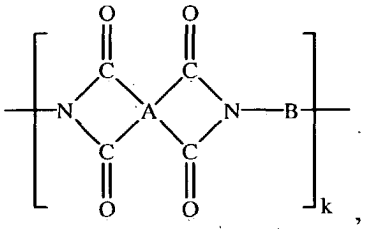
CLAIMS:

[c001] 1. A storage medium for data, the storage medium comprising:

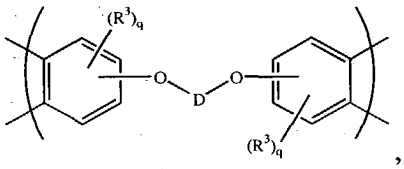
a) a substrate, a physical portion of which comprises at least one polyimide, and

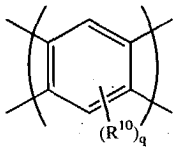
b) at least one data layer on the substrate;

the at least one polyimide comprising structural units of the formula:

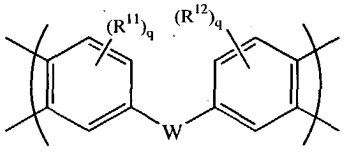


wherein "A" comprises structural units of the formulae:





or

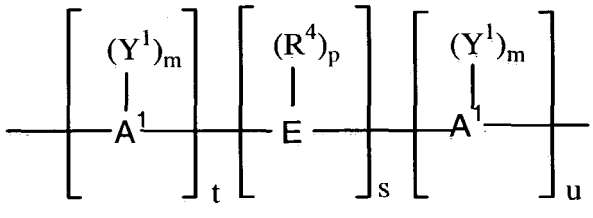


or mixtures of the foregoing structural units;

wherein "D" is a divalent aromatic group, R^3 and R^{10}–R^{12} are independently selected from hydrogen, halogen, and C_1–C_6 alkyl groups; "q" is an integer having a value of 1 up to the number of positions available on the aromatic ring for substitution; "W" is a linking group; and

wherein B comprises a divalent organic radical selected from aromatic hydrocarbon radicals having 6 to about 30 carbon atoms and substituted derivatives thereof.

[c002] 2. The data storage medium of claim 1, wherein "D" has the formula:



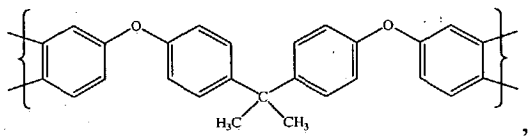
wherein A^1 is an aromatic group, E is an alkylene, an alkylidene, a cycloaliphatic group; a sulfur-containing linkage, a phosphorus-containing linkage; an ether linkage, a carbonyl group, a tertiary nitrogen group, or a silicon-containing linkage; Y^1 is selected from the group consisting of a hydrogen, a monovalent hydrocarbon group, alkenyl, allyl, halogen, bromine, chlorine; and nitro; wherein "m" represents any integer from and including zero through the number of positions on A^1 available for substitution; R^4 is a hydrogen or a monovalent hydrocarbon group, wherein "p" represents an integer from and including zero through the number of positions on E available for substitution; "t" represents an integer equal to at least one; "s" represents an integer equal to either zero or one; and "u" represents any integer including zero.

[c003] 3. The polyimide composition of claim 2, wherein "E" is a moiety selected from the group consisting of cyclopentylidene, cyclohexylidene, 3,3,5-trimethylcyclohexylidene, methylcyclohexylidene, neopentylidene, cyclododecylidene, adamantylidene, isopropylidene, bicyclo[2.2.1]hept-2-ylidene, 1,7,7-trimethylbicyclo[2.2.1]hept-2-ylidene, and $C{=}CZ_2$, wherein each Z is hydrogen, chlorine, or bromine, subject to the provision that at least one Z is chlorine or bromine; and mixtures of the foregoing moieties.

[c004] 4. The polyimide composition of claim 1, wherein "W" is selected from the group consisting of a covalent bond, oxygen, sulfur, sulfoxide, sulfone, silicon, carbonyl, or hexafluoro isopropylidene.

[c005] 5. The data storage medium of claim 1, wherein "A" comprises structural units derived from 2,2-bis[4-(3,4-dicarboxyphenoxy)phenyl]propane dianhydride; 2,2-bis[4-(2,3-dicarboxyphenoxy)phenyl]propane dianhydride; the mixed dianhydride 2-[4-(3,4-dicarboxyphenoxy)phenyl]-2-[4-(2,3-dicarboxyphenoxy)phenyl]propane dianhydride, 3,4,3',4'-benzophenonetetracarboxylic acid dianhydride, 3,3',4,4'-oxydiphthalic anhydride, 2,3,2',3'-biphenyltetracarboxylic acid dianhydride, pyromellitic dianhydride, 3,4,3',4'-diphenylsulfonetetracarboxylic acid dianhydride, 4,4'-bis(3,4-dicarboxyphenoxy)diphenyl sulfide dianhydride, 1,4-bis(3,4-dicarboxyphenoxy)benzene dianhydride, 4,4'-bis(3,4-dicarboxyphenoxy)diphenyl ether dianhydride, 2,2-bis(3,4-dicarboxyphenyl)hexafluoropropane dianhydride or mixtures of the foregoing dianhydrides.

[c006] 6. The data storage medium of claim 1, wherein "A" is selected from the group consisting of: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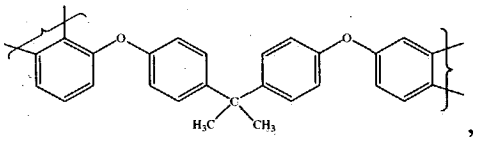
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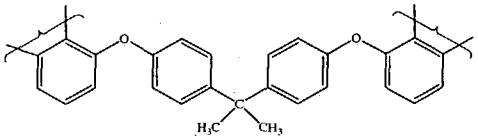

, and mixtures thereof.

[c007] 7. The data storage medium of claim 1, wherein "B" is selected from the group consisting of substituted and unsubstituted phenylene groups.

[c008] 8. The data storage medium of claim 1, wherein "B" comprises structural units derived from at least one diamine selected from the group consisting of 1,3-phenylenediamine, 1,4-phenylenediamine, 2-methyl-1,3-phenylenediamine, 4-methyl-1,3-phenylenediamine, 2,4,6-trimethyl-1,3-phenylenediamine, 2,6-diethyl-4-methyl-1,3-phenylenediamine, 3,6-diethyl-2-methyl-1,3-phenylenediamine, 2,5-dimethyl-1,4-phenylenediamine, 2,3,5,6-tetramethyl-1,4-phenylenediamine, 3,5'-dimethylbenzidene, 2,2',6,6'-tetramethylbenzidene, 3,5'-dimethoxybenzidene, 4,4'-diaminodiphenyl ether, 4,4'-diaminodiphenyl methane, fluorinated alkyl analogs of said diamines, 2-trifluoromethyl-1,4-phenylenediamine and mixtures thereof.

[c009] 9. The data storage medium of claim 1, wherein "B" comprises structural units derived from at least two diamines wherein at least about 45% of at least one diamine is selected from the group consisting of 1,3-phenylenediamine, 1,4-phenylenediamine, 2-methyl-1,3-phenylenediamine, 4-methyl-1,3-phenylenediamine, 2,4,6-trimethyl-1,3-phenylenediamine, 2,6-diethyl-4-methyl-1,3-phenylenediamine, 3,6-diethyl-2-methyl-1,3-phenylenediamine, 2,5-dimethyl-1,4-phenylenediamine, 2,3,5,6-tetramethyl-1,4-phenylenediamine, 3,5'-dimethylbenzidene, 2,2',6,6'-tetramethylbenzidene, 3,5'-dimethoxybenzidene, 4,4'-diaminodiphenyl ether, 4,4'-diaminodiphenyl methane and combinations thereof, based on the total weight of structural units derived from diamine.

[c010]10. The data storage medium of claim 1, wherein "k" is an integer having a value from 1 to about 50.

[c011]11. The data storage medium of claim 1, wherein said polyimide composition is a blend comprising a second polyimide wherein the said blend is a miscible blend.

[c012]12. The data storage medium of claim 1, wherein said polyimide composition has a mechanical damping coefficient of at least about 0.019 at a temperature of about 25 °C at a frequency of about 1.6 hertz.

[c013]13. The data storage medium of claim 1, wherein said polyimide composition has a mechanical damping coefficient of at least about 0.022 at a temperature of about 50°C at a frequency of about 1.6 hertz.

[c014]14. The data storage medium of claim 1, wherein said polyimide composition has a mechanical damping coefficient of at least about 0.025 at a temperature of about 100 °C at a frequency of about 1.6 hertz.

[c015]15. The data storage medium of claim 1, wherein said polyetherimide composition has a mechanical damping coefficient of at least about 0.05 at a temperature of above about 130 °C at a frequency of about 1.6 hertz.

[c016]16. The data storage medium of claim 1, wherein said polyimide composition has a mechanical damping coefficient of at least about 0.019 at a temperature in a range of about 25 °C to about 100 °C at a frequency of about 1.6 hertz.

[c017]17. The data storage medium of claim 1, wherein said polyimide composition has a glass transition temperature in a range of about 150 °C to about 350 °C.

[c018]18. The data storage medium of claim 1, wherein said polyimide composition has a glass transition temperature in a range of about 170 °C to about 300 °C.

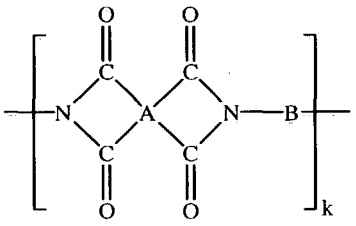
[c019]19. The data storage medium of claim 1, wherein said polyimide composition has a glass transition temperature in a range of about 180 °C to about 280 °C.

[c020]20. A storage medium for data, the storage medium comprising:

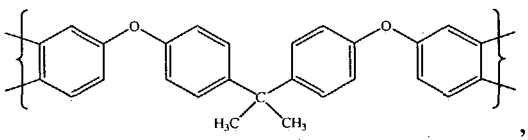
a) a substrate, a physical portion of which comprises at least one polyimide, and

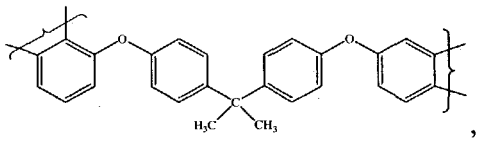
b) at least one data layer on the substrate;

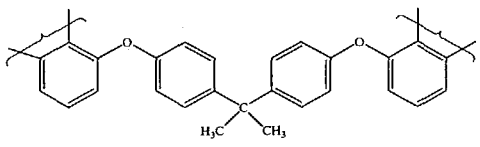
the at least one polyimide comprising structural units of the formula:



wherein "A" comprises structural units selected from the group consisting of:







and mixtures thereof; and

B comprises a divalent organic radical selected from aromatic hydrocarbon radicals having 6 to about 30 carbon atoms and substituted derivatives thereof.

[c021]21. The data storage medium of claim 20, wherein "B" comprises structural units derived from at least one diamine selected from the group consisting of 1,3-phenylenediamine, 1,4-phenylenediamine, 2-methyl-1,3-phenylenediamine, 4-methyl-1,3-phenylenediamine, 2,4,6-trimethyl-1,3-phenylenediamine, 2,6-diethyl-4-methyl-1,3-phenylenediamine, 3,6-diethyl-2-methyl-1,3-phenylenediamine, 2,5-dimethyl-1,4-phenylenediamine, 2,3,5,6-tetramethyl-1,4-phenylenediamine, 3,5'-dimethylbenzidene, 2,2',6,6'-tetramethylbenzidene, 3,5'-dimethoxybenzidene, 4,4'-diaminodiphenyl ether, 4,4'-diaminodiphenyl methane, fluorinated alkyl analogs of said diamines, 2-trifluoromethyl-1,4-phenylenediamine and mixtures thereof.

[c022]22. The data storage medium of claim 20, wherein said polyimide composition has a mechanical damping coefficient of at least about 0.019 at a temperature of about 25 °C at a frequency of about 1.6 hertz.

[c023]23. The data storage medium of claim 20, wherein said polyimide composition has a mechanical damping coefficient of at least about 0.022 at a temperature of above about 50 °C at a frequency of about 1.6 hertz.

[c024]24. The data storage medium of claim 20, wherein said polyimide composition has a mechanical damping coefficient of at least about 0.025 at a temperature of above about 100 °C at a frequency of about 1.6 hertz.

[c025]25. The data storage medium of claim 20, wherein said polyetherimide composition has a mechanical damping coefficient of at least about 0.05 at a temperature of above about 130 °C at a frequency of about 1.6 hertz.

[c026]26. The data storage medium of claim 20, wherein said polyimide composition has a mechanical damping coefficient of at least about 0.019 at a temperature in a range of about 25 °C to about 100 °C at a frequency of about 1.6 hertz.

[c027]27. The data storage medium of claim 20, wherein "B" comprises structural units derived from at least two diamines wherein at least about 45% of at least one diamine is selected from the group consisting of 1,3-phenylenediamine, 1,4-phenylenediamine, 2-methyl-1,3-phenylenediamine, 4-methyl-1,3-phenylenediamine, 2,4,6-trimethyl-1,3-phenylenediamine, 2,6-diethyl-4-methyl-1,3-phenylenediamine, 3,6-diethyl-2-methyl-1,3-phenylenediamine, 2,5-dimethyl-1,4-phenylenediamine, 2,3,5,6-tetramethyl-1,4-phenylenediamine, 3,5'-dimethylbenzidene, 2,2',6,6'-tetramethylbenzidene, 3,5'-dimethoxybenzidene, 4,4'-diaminodiphenyl ether, 4,4'-diaminodiphenyl methane and combinations thereof, based on the total weight of structural units derived from diamine.

[c028]28. The data storage medium of claim 20, wherein said polyimide composition is a blend comprising a second polyimide wherein the said blend is a miscible blend.

[c029]29. The data storage medium of claim 20, wherein said polyimide composition has a glass transition temperature in a range of about 150 °C to about 350 °C.

[c030]30. The data storage medium of claim 20, wherein said polyimide composition has a glass transition temperature in a range of about 170 °C to about 300 °C.

[c031]31. The data storage medium of claim 20, wherein said polyimide composition has a glass transition temperature in a range of about 180 °C to about 280 °C.